ORIGINAL

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)
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WIRELESS FIXED ACCESS	)
LOCAL LOOP SERVICES	)
	)
	)
	)
Petition for Allocation of Radio Spectrum	)
in the 2 GHz Band for the Provision	)
of Wireless Fixed Access Local Loop Services	)

RM No. _____

TO: The Commission

DSC COMMUNICATIONS CORPORATION PETITION FOR RULEMAKING

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SUMMARY

In the wake of the Telecommunications Act of 1996, it is clear that the development of facilities-based local competition is an important national objective. Such competition will benefit the public by offering subscribers more choice, lower prices, and better service. Wireless fixed access-local loop ("WFA-LL") can facilitate the rapid deployment of an alternative to the wireline local loop of the incumbent service provider in a cost-effective manner. Thus, WFA-LL holds out the promise to accelerate the introduction of facilities-based local competition, in the near term, as well as extend it to areas that may not enjoy new competitors for many years, if ever.

The WFA-LL architecture is a type of wireless local loop ("WLL") deployment that completely replaces the drop, distribution and feeder networks of wireline local loops. WFA-LL systems have been specifically designed, and are being deployed or tested in numerous countries, to support advanced services and wire-line quality. Generally WFA-LL systems have been optimized as a complete alternative to copper-based networks in semi-rural to urban environments. This type of architecture can be deployed rapidly and, relative to other WLL architectures, at the lowest cost with the widest range of capabilities. Wide-area geographic coverage typically ranges from a hundreds of feet to several miles.

WFA-LL offers a number of public interest benefits. For example, WFA-LL service assists in lowering the key barriers to entry, namely time and money, and is therefore ideal for fostering the emergence of local competition. WFA-LL deployment is far less capital

intensive than copper or fiber local loop. Just as importantly, wireless local loop technology can be deployed to serve an area much more quickly than wireline technologies, breaking down the time barrier.

In addition, by installing WFA-LL facilities in combination with copper or fiber loop, a local carrier could minimize costs. While the initial phase of implementation might involve the rapid deployment of wireless loop facilities ubiquitously, later phases might see the "back-filling" of urban and some suburban areas with copper and fiber plant.

Apart from promoting local competition, wireless local loop technology can support another important goal of the 1996 Act, namely universal service to rural and high-cost areas. The deployment of wireless local loop technology to a more widely scattered population is much more cost-effective than wireline solution. Even where rural and high-cost areas are already served by wireless technologies, the availability of WFA-LL service encourages facilities-based competition that very well might not otherwise emerge.

To be successful, a WLL architecture must emulate the copper-based infrastructure and its performance characteristics. WLL covers a very broad spectrum of system architectures and network applications. DSC Communications Corporation ("DSC") submits that the WFA-LL architecture is the best and most cost-effective solution. Unlike mobile-derived fixed cellular/PCS and wireless drop architectures, *e.g.*, CT2 and DECT, WFA-LL architecture is designed to provide toll quality voice and premium services, just as the wireline infrastructure supports today. Facsimile, data and other premium services a wireline customer takes for granted cannot be delivered at "sub-grade" quality. Therefore, while the FCC late last year

proposed in WB Docket No. 96-6 to make available CMRS spectrum for flexible fixed use, these CMRS applications are not well suited to provide the extent and quality of services currently provided on the copper-based wireline network. Furthermore, given the heavy mobile usage that is already being made of, or is expected for, CMRS spectrum, it is probable that WLL use of the spectrum -- if the FCC adopts its proposal in Docket No. 96-6, will prove woefully inadequate to meet the demand for WLL.

With regard to microwave point-to-point and point-to-multipoint WLL architectures, although network quality features may be supported, only the WFA-LL architecture is designed for wide-area coverage at a substantially lower cost. Wide-area coverage is accomplished by multiple sites radiating in omnidirectional, rather than point-to-point, modes. This feature also makes the system easier and quicker to install than either the wireline or other wireless architectures. By avoiding the need for any use of the local wireline network or public rights of way, as well as the need for any intermediate base stations, the WFA-LL architecture can be installed with the least construction delay and only minimum local government involvement. Accordingly, only the WFA-LL architecture has the potential to provide full-fledged competition to wireline local loop services.

DSC proposes that spectrum between 1.3 and 2.7 GHz should be used for WFA-LL services. The choice of this spectrum has a historical basis. In the past, the radio spectrum between 1.3 and 2.7 GHz has been used for a variety of applications, especially microwave point-to-point radio links. In many countries, these radio links have now been totally or partially taken out of service and replaced with optical fiber systems and/or digital point-to-

point radio links, which generally operate in spectrum above 3 GHz. This shift in technology is gradually freeing up spectrum below 3 GHz for new radio-based services such as WFA-LL service. Thus, many manufacturers, including DSC, have designed equipment for operation in much or all the 1.3-2.7 GHz range. Fortunately, the 2 GHz frequency band is a practical band of operation for fixed WLL systems in terms of the achievable cell size, radio coverage or penetration within a cell and immunity to rainfall or fog attenuation. The use of higher frequency bands (> 3 GHz) would significantly reduce the radio coverage as a function of power and rainfall immunity. Concomitantly, at higher frequencies, smaller cells would need to be deployed to cover a target end-user population, increasing the overall WFA-LL network deployment costs. Higher frequencies would also require communications to be more point-to-point in nature, further increasing costs. All of these factors would combine to undermine the potential public benefit from a WFA-LL alternative to the incumbent local provider.

In surveying the present U.S. spectrum allocations between 1.3 and 2.7 GHz, it appears that there are several possibilities for spectrum allocations for WFA-LL. In most cases, the spectrum would need to be allocated on co-primary basis. In addition, several of these potential WFA-LL bands are in states of possible reallocation due to service relocations and/or service redefinition. Specifically, DSC proposes for consideration the following frequency alternatives for a WFA-LL allocation: (A) 1668-1700.0/1723.5-1755 MHz, (B) 2037.5-2076.0/2111.5-2150.0 MHz, (C) 2110.0-2145.0/2165.0-2200.0 MHz, (D) 2160.0-2198.5/2310.0-2348.5 MHz, (E) 2400.0-2438.5/2160.0-2198.5 MHz, and (F) 2401.0-2439.5/2310.0-2348.5 MHz.

In the event that spectrum is granted using one of the alternatives proposed, then spectrum allocated for WFA-LL service should be licensed to one applicant per geographic licensing area. If more spectrum becomes available, then two licensees can be accommodated per licensing area. While only one licensee would not allow "wireless competition in the local loop, the real competition is with "wireline" providers. A single, economically viable wireless competitor would greatly enhance competition in the local exchange marketplace.

In order to maximize the efficient use of this spectrum, it should be licensed on a geographic basis that comports best with the provision of local exchange services. While no exact division of the country exists for this purpose, DSC submits that licensing on an MSA and RSA basis would be appropriate. A less desirable, but still acceptable, alternative would be to license WFA-LL licenses on a Basic Trading Area basis. WFA-LL licenses, in the case of mutually exclusive applications, should be awarded through competitive bidding. DSC envisions that WFA-LL service, as a substitute for local exchange services, would be regulated as a common carrier service subject to Title II of the Communications Act of 1934, as amended. More specifically, DSC contemplates that WFA-LL licensees will use their spectrum to support the provision of competitive local exchange and access services. In other words, WFA-LL licensees would be "local exchange carriers" under Section 251 of the Act and would be subject to the obligations imposed on such carriers.

The technical rules applicable to WFA-LL operations should maximize license flexibility, while ensuring that licensees in adjacent geographic areas and in adjacent frequency blocks are adequately protected. In addition, where coexistence with other services is required, the

appropriate technical rules will need to be modified to ensure adequate protection for all involved services. As a general guideline, the nature and scope (although not necessarily the specifics) of the technical rules for broadband PCS provide an appropriate model.

In conclusion, the FCC should promptly issue a notice of proposed rulemaking to establish a WFA-LL service. The introduction of this service will prove to be an important step in the development of local telephone competition and will bring subscribers the benefits of lower prices and increased choices in both services and providers.

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TO: The Commission

DSC COMMUNICATIONS CORPORATION
PETITION FOR RULEMAKING

DSC Communications Corporation ("DSC"), by its attorneys, hereby requests the initiation of a rulemaking proceeding to allocate radio spectrum in the "2 GHz" band for use in the provision of wireless fixed access local loop[1] ("WFA-LL") services. Specifically, radio frequencies in the 1.3 - 2.7 GHz bands have the proper combination of propagation characteristics and bandwidth to satisfy the public need for creation of a WFA-LL service. For the reasons stated below, the public interest will be greatly enhanced by the allocation of this spectrum for WFA-LL usage

[1] Wireless Fixed Access Local Loop, as explained in detail below, is the most cost effective and feature-rich architecture supporting Wireless Local Loop ("WLL") services. See "WLL System Description," infra.

I. INTRODUCTION AND BACKGROUND

A. Statement of Interest

DSC is a publicly traded, Texas-based manufacturer of communications switching, access, and transmission equipment. Incorporated in September 1976, DSC had revenues of more than $1.4 billion in 1995. DSC's products are utilized by six of the Regional Bell Companies, MCI, several independent telephone companies and numerous U.S. interexchange carriers. In addition, DSC equipment is in use by telecommunications carriers today in over 50 nations around the globe.

DSC's experience in supplying equipment to telecommunications companies all over the world revealed to DSC the need for the establishment of an efficient and inexpensive WFA-LL service. The need for WFA-LL service applies internationally as well as in the United States. In order to expedite the introduction of a wide variety of services at the lowest possible cost, many nations have deployed WFA-LL systems in the 2 GHz frequency range. DSC believes these same characteristics -- richness of service features, speed and low cost of installation -- make WFA-LL services a valuable addition to the choices available to U.S. telecommunications carriers and consumers, especially as local competition begins to develop in earnest. The benefits of WFA-LL systems can be made available most promptly and efficiently if introduced in the 2 GHz frequency range to permit use of the same technology being deployed in the rest of the world.

B. Petition for Rulemaking

This Petition for Rulemaking is organized to address each of the important sets of questions which the Commission must consider in allocating radio spectrum. Section II discusses the market demand and public need for the creation of a WFA-LL service. In addition, Section II describes several wireless local loop architectures and demonstrates why the Wireless Fixed Access architecture provides the best combination of feature-richness and cost effectiveness for satisfying the WLL service need. Section III provides a detailed description of the system components, the basis and advantages of choosing Code Division Multiple Access (CDMA) technology, and a brief discussion of a channelization scheme of a WFA-LL system. Section IV provides a global view of spectrum management and frequency allocations in the 1.3 to 2.7 GHz band and the rationale for the choice of WFA-LL spectrum within these bands. Section V describes potential channel plans, within the "2 GHz" band, for WFA-LL system deployment in the United States. Section VI addresses rules and policies for the licensing and operation of WFA-LL services. Section VII concludes the document.

With this Petition, the Commission has a complete basis for issuing a Notice of Proposed Rulemaking looking toward the prompt allocation of spectrum and adoption of rules for the WFA-LL service.

II. THE PUBLIC NEED FOR WLL IS LARGE AND GROWING

A. Existence of Public Need

The new competitive local telecommunications environment in the U.S. being ushered in by Congress, the FCC, and state public utility commissions promises users more choice, lower prices, and better service. Urban, suburban, and rural business customers and consumers anticipate one-stop shopping for a full array of communications services: local, long distance, wireline, wireless, video entertainment and information services. Customers will expect to be able to purchase whatever services they want, the way they want them. WFA-LL service will assist system operators in offering competitively-priced, one-stop shopping by facilitating the rapid development of alternatives to the incumbent local loop for the "last mile" to the network. Without such alternatives, system operators in many cases will remain dependent on the incumbent providers of local service to complete their service packages.

Increasing local competition and the deployment of wireless local loop ("WLL") architectures represents a growing trend internationally, as well as domestically. According to a November 1995 report published by Northern Business Information "Global Wireless Local Loop Markets: 1995 Edition", there are over 55 commercial deployments or trials of WLL systems in 31 countries on 5 continents.[2] Many of these deployments are in well-developed countries (e.g. France, Germany, Japan, United Kingdom) where changes in the regulatory

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[2] Appendix A contains a copy of Exhibit 3-6 "Selected Wireless Local Loop Implementations: Commercial Implementations and Market Trials" from NBI's "Global Wireless Local Loop Markets: 1995 Edition". Reproduced by permission from the author.

environment are fostering the introduction of competitive wireless loop services. For those countries where the fundamental need for basic telephone service remains unsatisfied, wireless loop is forging ahead with quickly deployed, cost-effective systems and services.

Forecasts of demand for WLL services vary considerably. However, one consistent conclusion that can be drawn from the forecasts is that global WLL service demand will grow several fold over the next 5 - 10 years. As might be expected, the largest growth will be in developing markets. In a recently published report by MTA-EMCI "Wireless Local Loop: Opportunities in the Global Marketplace," the number of WLL subscribers forecast for the year 2000 will be 60 million, with half of the subscribers in developed markets and the other half in developing markets. By 2005, the number of subscribers forecast in developed countries will be 54 million, with almost three times that amount, 148 million, in developing countries. Of the 54 million subscribers in developed countries, MTA-EMCI estimates 41% (or more than 22 million) of the WLL subscribers will reside in North America.[3] An important concept to note is that tremendous economies of scale in equipment and services prices can be achieved via the high-volume usage of the same equipment/services across several market segments. These resultant cost savings can, in turn, be passed along to the benefit of the consumer.

Industry analysts are not alone in their recognition of the tremendous impending explosion of wireless loop systems. The United States Congress, the Cellular Telecommunications Industry

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[3] The MTA-EMCI information is from a summary of this report in PR Newswire, March 20, 1996.

Association (CTIA), many equipment manufacturers, and hundreds of service providers have all recognized and reacted, in their respective fashions, to this important new market segment.

Certainly, the FCC has recognized the important role that WLL will play in the United States. As an important first step, the Commission has issued a *Notice of Proposed Rulemaking* in WB Docket No. 96-6, proposing to allow commercial mobile radio service ("CMRS") providers to make flexible, *i.e.,* fixed, use of their mobile spectrum, including WLL applications. In that proceeding, the Commission noted that WLL can help "remov[e] barriers to competitive provision of local exchange service."[4] However, as detailed further below, fixed cellular and other fixed CMRS applications are not well suited to provide the full range of WLL services that customers will demand, further positioning WFA-LL service as an effective alternative to wireline service. Furthermore, given the heavy mobile usage that is already being made of cellular and SMR allocations and the prospects for similarly intense usage of PCS spectrum, it is probable that WLL use of the spectrum -- if the FCC adopts its proposal in Docket No. 96-6 -- will prove woefully inadequate to meet the demand for this capability. Finally, the importance of WFA-LL services to the development of local exchange competition is such that its deployment should not depend upon the CMRS marketplace.

The allocation of spectrum for WFA-LL services will advance the public interest objectives of the Communications Act of 1934. Specifically, the availability of spectrum for competitive wireless fixed access loops will help "make available to all people of the United States a rapid,

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[4] Flexible Service Offerings in the Commercial Mobile Radio Services, Notice of Proposed Rulemaking, FCC 96-17 (released January 25, 1996), ¶¶ 8 - 9.

efficient, nation-wide, and world-wide wire and radio communications service with adequate facilities at reasonable charges "[5] By supporting delivery of local exchange services using advanced WLL technologies, the FCC would also be advancing "the policy of the United States to encourage the provision of new technologies and services to the public."[6]

WFA-LL service assists in lowering the key barriers to entry, namely time and money, and is therefore ideal for accelerating the emergence of local competition. By facilitating entry into the local exchange marketplace, WFA-LL technology also promotes one of the central objectives of the recently enacted Telecommunications Act of 1996: the encouragement of facilities-based local competition.[7] With increased facilities-based competition, subscribers will benefit from downward pressure on prices and a larger selection of providers and services.

WFA-LL service lowers the cost barrier because its deployment is far less capital intensive than copper or fiber local loop. As the length of the loop increases, *i.e.*, the distance traversed between the local exchange carrier's switch and the end users, the cost advantages tip even more heavily in favor of WFA-LL service. Just as importantly, wireless local loop technology can be deployed to serve an area much more quickly than wireline technologies,

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[5] 47 U.S.C. § 151.

[6] *Id.* § 157(a).

[7] *See* 47 U.S.C. §§ 251 (c) (1)-(6) (obligations of incumbent LECs to accommodate facilities-based competition), 252 (negotiation and arbitration of interconnection agreements), and 272 (facilities-based competition as a pre-condition to RBOC entry into in-region long distance markets).

breaking down the time barrier. What might take several years if done on a copper or fiber basis might take only a matter of months using WFA-LL technology. This reduction in deployment time occurs for several reasons. For example, the deployment of a wireless local loop network, even over a wide-area, avoids the need to negotiate rights-of-way, and the local government civil works-related authority is limited principally to base station preparation. Stations completing a loop would typically be installed in considerably less time than it takes to run the wire.

By installing networks utilizing WFA-LL facilities in combination with copper or fiber loops, a local carrier could optimize its economics to minimize costs. While the initial phase of implementation might involve the rapid deployment of wireless loop facilities throughout the network, later phases might see the "back-filling" of urban and some suburban areas with copper and fiber plant.

In addition, a local operator can adjust WFA-LL cell size, depending on terrain and subscriber density. For example, in rural areas, the wireless link could be extended up to about 15 km using DSC's Airspan® products. In contrast, the cell size, in urban areas, can be reduced to approximately 500 meters. Accordingly, the flexibility of the WFA-LL products such as DSC's Airspan® accommodates frequency re-use in any geographic area appropriate to the population density, maximizing the WFA-LL technology's potential usefulness.

WFA-LL technology also supports another important goal of the Telecommunications Act of 1996, namely universal service to rural and high-cost areas. The deployment of WFA-LL technology to a more widely scattered population is much more cost-effective than wireline

solutions. Therefore, it will be much more economical to install and maintain service to rural and high-cost areas using wireless local loop rather than copper and fiber technologies. Even where rural and high-cost areas are already served by wireless technologies, the availability of WFA-LL service will encourage facilities-based competition that very well might not otherwise emerge.

Furthermore, WFA-LL technology offers efficient solutions to restoring service quality following natural disasters that cause major disruptions to local telephone service. Indeed, coastal areas, islands, and other locations prone to such disasters (e.g. hurricanes), may be better served by the installation of wireless local loops. WFA-LL technology is also appropriate for deploying a local "network" on a temporary basis, such as a special large-scale event like the Olympic Games.

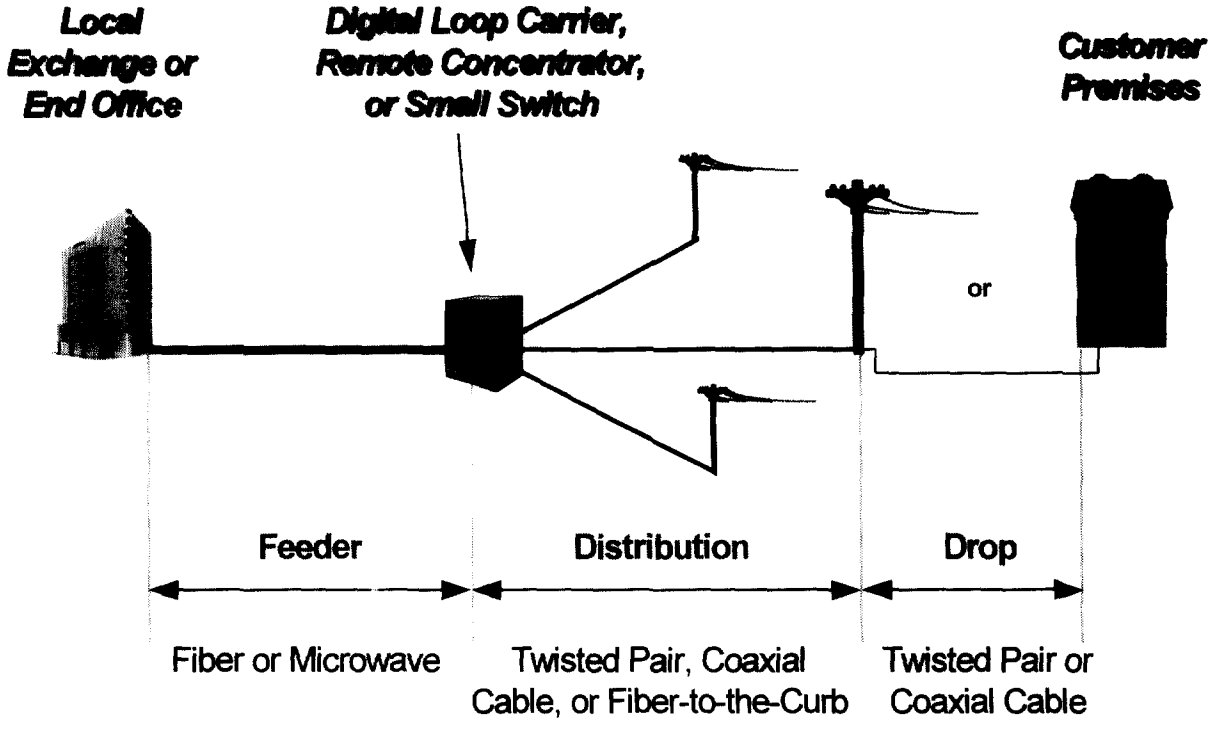
In sum, the encouragement of facilities-based competition, reduction in capital costs, deployment time, and services and maintenance costs, expedient disaster recovery, and rapid deployment capabilities for temporary events are all valid reasons in proving that the public need can be well served by the WFA-LL services solution.

B. The Public Need is Best Served by Wireless Fixed Access (WFA) Systems

In a highly developed, telecommunications marketplace like the United States, subscribers expect certain services and features from the wireline telecommunications network. For example, subscribers expect to be able to use the standard terminal equipment of their choice to access the network. In addition, subscribers demand that there be minimal delays in

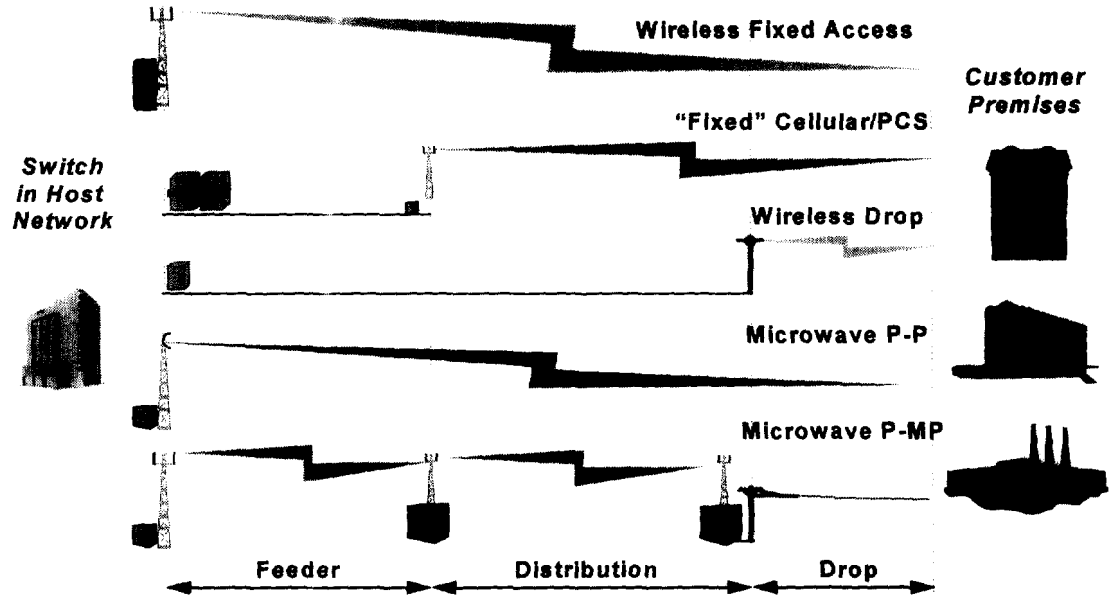
the times to obtain dialtone and establish ringing tone and insignificant delays in voice delivery so that the flow of conversation can be natural. Users have come to rely upon high clarity voice connections -- *e.g.*, lack of distortion and freedom from noise -- that is at least as good as the best copper connection. Similarly, many customers expect the network to be able to support advanced call features. such as caller ID, call transfer, and call blocking. Subscribers also expect, on an ubiquitous basis, when sending facsimiles to be able to use equipment compliant with present and future Group 3 standards and other current voice-band modems. Furthermore, given the importance of the network for data transfer, subscribers expect the network to be able to minimally support a rate of 64 Kbps. Finally, as the demand for integrated software defined network ("ISDN") services increase, network users will require ISDN network support.

To successfully support the features discussed above, a WLL architecture must emulate the copper-based infrastructure and its performance characteristics for voice, facsimile, data, and ISDN services. As it is used today, Wireless Local Loop ("WLL") is the generic term used to describe the application of radio technology in the local access network as an alternative to copper "local loops". It covers a very broad spectrum of system architectures and network applications. Shown in the Figure below is a schematic for a typical copper access network architecture representing more than 90% of all copper pairs installed around the world today. This architecture consists of three parts, the Feeder network, the Distribution network and the Drop.



Typical Copper Access Network Architecture

As stated above, there are several architectures which can be considered WLL architectures. The five principal architectures (see Figure below), Fixed Wireless Access, Fixed Cellular/PCS, Wireless Drop, Microwave Point-to-Point, and Microwave Point-to-Multipoint, are shown in the manner in which they map onto the "copper" access network architecture.



Different Wireless Local Loop Architectures

The **Wireless Fixed Access** (WFA) architecture is the system architecture that completely replaces the Drop, Distribution and Feeder Networks. This type of system has been specifically designed to support advanced services and wire-line quality. Generally they have been optimized as an alternative to copper-based networks in semi-rural, suburban, and urban environments. This type of architecture can be deployed rapidly and, relatively speaking, at the lowest cost with the widest range of capabilities. Wide-area geographic coverage typically ranges from a several hundred feet to several miles.

The **Fixed Cellular/PCS** architecture, as the name implies, is the application of Cellular/PCS Radio technology in the local loop. These types of systems replace the Distribution and Drop parts of the network and typically require the installation of special Switching and Base Station

sites. This requirement increases the costs of installation relative to WFA. A major disadvantage of the Fixed Cellular/PCS architecture is that the systems were originally designed for mobile cellular and, having been adapted for "fixed" WLL application, do not have the throughput to support advanced services or wire-line quality. Wide-area geographic coverage typically ranges from a few hundred feet to several miles.

The **Wireless Drop** architecture replaces only the Drop segment, i.e. the last 330 feet (100 meters). This architecture is typically based on Cordless Telephony Technology such as CT2 and DECT. It is suitable for suburban and urban deployments and can also provide limited mobility. Although some of the Wireless Drop solutions may support advanced telephony features (DECT), the main drawback of the Wireless Drop architecture is that it is a costly solution for a service provider seeking wide-area geographic coverage.

The **Microwave Point-to-Point** architecture is typically used for the dedicated point-to-point connection of larger users to the switched network. This type of system is designed for N x 2Mbps/1.5Mbps distribution and is typically deployed in the Urban/Suburban areas @ 10 GHz+. It is not well-suited for a wide-area, large population density service due to the high per-line costs.

The **Microwave Point-to-Multipoint** architecture is based on a mature technology that addresses telephony service in remote rural areas. This architecture supports long distance Feeder and Distribution capabilities and is typically configured to provide multiple multi-line drops rather than single radio links per premises. Similar to the Point-to-Point architecture, Point-to-Multipoint solutions are not well-suited for WLL system deployment for cost reasons.

Besides output power and propagation-related characteristics, there are several major differences between these architectures. These differences relate to such items as voice quality, the types of services offered, and costs per installed line. These differences, as well as propagation range, are outlined for each architecture in the table below:

Architecture	Typical Max. Propagation Range (mi.)	Toll Quality POTS	Premium Services [1]	Typical Installed Cost per Line [2] ($)
Wireless Fixed Access	10-12	Y	Y	700-900
Fixed Cellular/PCS	15-20	N	N	900-1500
Wireless Drop [3]	< 1	Y	N	1200-1400
Point to Point [4]	20-30	Y	Y	1300-1700
Point to Multipoint [4]	20-30	Y	Y	2200-3200

[1] Premium Services=ISDN, Digital Data, Fax, Fast Modems.
[2] Installed costs include radio, infrastructure, and switching components.
[3] The DECT Wireless Drop architecture is capable of supporting some of the premium services.
[4] Maximum range can be several hundred miles with repeaters.

Unlike mobile-derivative Fixed Cellular/PCS and the Wireless Drop architectures, the WFA architecture has been designed to provide toll quality voice and premium services, just as the wireline infrastructure supports today. The basic designs of the Fixed Cellular/PCS and Wireless Drop systems are for low-to-mid and mid-bit rate voice applications, respectively. For WFA-LL services, the bandwidth per channel or link, must be sufficient to support the range of services defined. For most applications, this range of bandwidth is between 32 kbps to 144 kbps, or ADPCM-coded voice to ISDN. While voice can be delivered with varying

degrees of quality with less bandwidth, fax, data and other premium services a wireline customer takes for granted cannot be delivered at "sub-grade" quality.

With regard to the Microwave Point-to-Point and Point-to-Multipoint architectures, although the same features may be supported, the WFA architecture is designed for wide-area coverage at a substantially lower cost. Wide-area coverage is accomplished by multiple sites radiating in omnidirectional and/or directional modes. This feature also makes the system easier and quicker to install than either the wireline or other wireless architectures. By avoiding the need for any use of the local wireline network or public rights of way, as well as the need for any intermediate base stations, the WFA-LL architecture can be installed with the least construction delay and only minimal local government involvement.

The public need for these WLL services and the desire of new local service competitors to build their own networks makes clear that the time is ripe for creation of a WFA-LL service. The availability of this technology, with all its concomitant advantages, will lower costs and enhance competition, thus greatly benefiting consumer welfare in the United States.

III. DETAILED WIRELESS FIXED ACCESS - LOCAL LOOP SYSTEM DESCRIPTION

A. System Components

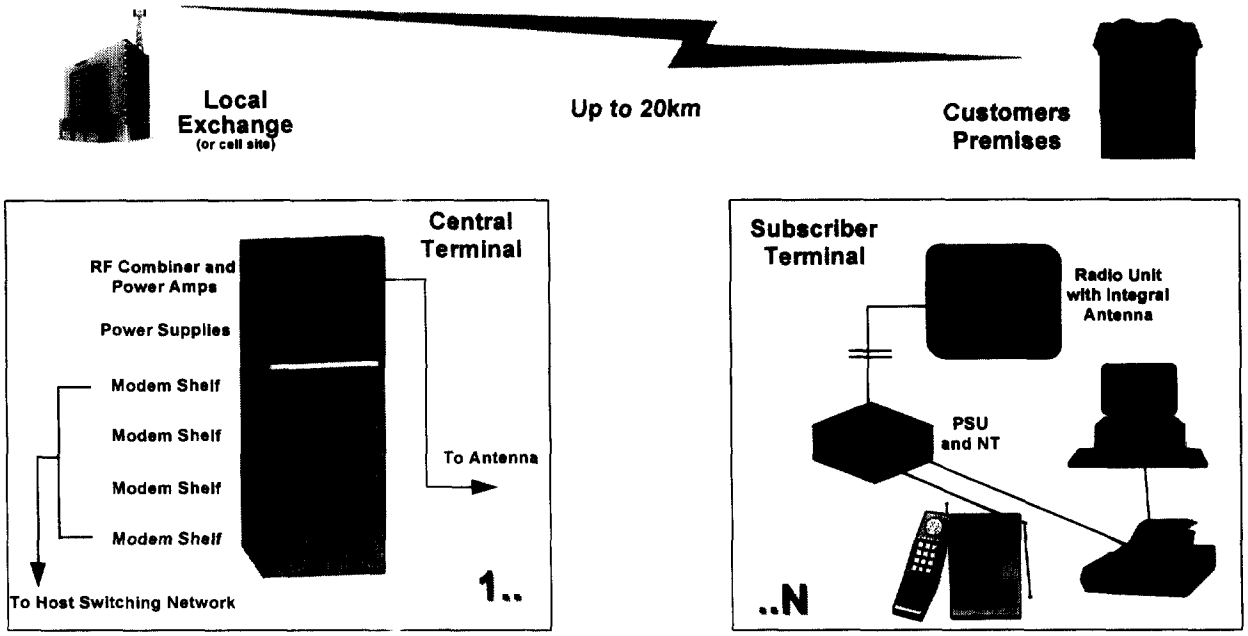
As explained above, a WFA-LL system is a digital wide-area radio access system providing wireless subscriber access to a telecommunication operator's network for voice, fax, data and ISDN services. The system is designed to offer the same functionality as "copper pairs" and therefore provides a direct alternative to the use of copper cabling for the delivery of these services to subscribers.

The system uses a radio link between the subscriber premises and the network operator's "local point of presence" as a replacement for the copper pair "local loop." The "local point of presence" will typically be the local exchange premises. If greater flexibility or range is required, the network radio equipment can be located in a suitable building or environmentally protected wayside cabinet, closer to the subscriber(s).

Each subscriber is served by a radio carrier-borne traffic channel, which can be configured to support a range of telephony services, from two-wire analog telephony circuits (POT services) to Basic Rate ISDN. The analog telephone circuits can be locally distributed to serve multiple subscribers, if required. Provision of other services will depend upon the capabilities of, and the interface to, the operator's network.

The system consists of two major physical blocks (See Figure below). These modules are the Subscriber Terminal (ST) which is located at the subscriber premises and the Central Terminal

(CT). The Central Terminal equipment will normally be located in the network operator premises.



The Subscriber Terminal and Central Terminal terminate each end of the radio link and convert them to the appropriate communication interface. In the case of the Central Terminal, the communications interface is the interface to the network operator's switching equipment. In the case of the Subscriber Terminal, the communications interface is the service interface to the subscriber's telecommunications equipment. To support a variety of telecommunications interfaces, the Subscriber Terminals are provided in the following versions:

- ST-V2, which supports two non-blocking two-wire analog telephony connections
- ST-I1, which supports one Basic Rate 2B+D "S" interface connection
- ST-D128, which supports a G.703 termination for transporting two 64 kbps time slots
- ST-M120 (Multiline) which supports up to 120 two-wire analog telephony connections.